

With kind regards, J.C.B.

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PHYSICAL EFFICIENCY IN CHILDREN.

DR. BROTHART
Muttery House

BY

SIR JAMES CRICTON-BROWNE, M.A., LL.D., F.R.S.,

*Vice-President of the Royal Institution; Lord Chancellor's
Visitor in Lunacy, etc.*

THE PRESIDENTIAL ADDRESS DELIVERED BEFORE
THE MEDICAL SECTION OF THE INTERNATIONAL
CONGRESS FOR THE WELFARE AND PROTECTION OF
CHILDREN, HELD IN LONDON ON THE 15TH JULY, 1902.

LONDON:
P. S. KING & SON,
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SIR JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.,
ON
PHYSICAL EFFICIENCY IN CHILDREN.

THE Angles and Saxons, the Teutonic ancestors of us English, who are this year privileged to be the hosts of this International Congress for the Welfare and Protection of Children, even in primitive times when they dwelt in Slesvig and Holstein, had two distinguishing characteristics—the strength of their domestic affections, and their activity in all their pursuits. They were very careful of little children, and tender towards them, and had a goddess, Hulda or Bertha, whose mission it was to protect them, and who was represented as the moon, taking up the souls of those of them that died and gathering them around her as the stars ; and they were very energetic and manly, not indolent and pleasure-seeking, but applying themselves earnestly and vigorously to whatever their hands found to do. And it is, I feel sure, by the continuous operation and gradual evolution of the moral and physical qualities thus early displayed, that the expansion and progress of the Anglo-Saxon race has been achieved, and it is clearly upon their survival and plenitude that the maintenance of its manhood and empire must depend.

It is therefore of vital importance that we in this country should keep constantly in view the basic conditions of our prosperity and very existence, namely, the well-being of our children and the physical development of our adult population, and these two are really mutually dependent on each other, for the physical development of the adult population is impossible without the due care and nurture of children, and the due care and nurture of children is impossible without that physical development of the adult population which is requisite in order that the children may be supplied with adequate sustenance. This Congress cannot fail to be useful to us by reminding us of some of our manifold duties towards children, which we are

apt to overlook, and by emphasising certain degenerative tendencies in our race which are associated with, if not inherent in, modern civilisation.

In this section of the Congress our attention is concentrated on the medical and hygienic aspects of childhood, which, although intimately interwoven with economical and educational questions, yet admit of separate treatment; and in opening your deliberations on these I would, in the first place, point out to you how greatly we still stand in need of precise scientific data by which to regulate our procedure for the preservation or restoration of the health of the young. It is with the child as an animal that we are mainly concerned. We have to regard it as a complex living organism, cunningly knit together, endowed with certain definite hereditary characteristics and dispositions, with an incalculable tendency to individual variation, and capable of modification within certain limits by environment, and it is therefore of primary consequence, if we would secure the welfare and protection of that organism—singly and on the large scale—that we should be acquainted with its physical attributes in all its biological phases. Its dimensions, and those of the different parts of which it is composed, their form at each epoch of growth and range of natural deviation, and their proportionate relations, must, when accurately ascertained, afford us the surest guidance in adjusting surrounding conditions so as to promote the material welfare of the organism, and therefore it is that I would plead for a measuring as well as a numbering of the people.

In an admirable letter which appeared in the *Times* of the 26th of November last, Lord Grey advocated the universal measuring and weighing of our children periodically, as an essential preliminary to the adoption of measures for the preservation of our national physique; and the serious and favourable reception given to his recommendation marks, I think, a great and beneficent change in our attitude towards child-study, for I well remember that when exactly the same suggestion was offered by me some twenty years ago it was greeted with derision. In a report on "Over-pressure in Elementary Schools," which I prepared in 1884, and which was printed by order of the House of Commons, I ventured to say that valuable information would be obtained were a register of the height, weight, head and chest girth of the children kept in every school, and I pointed out that a logbook of this kind would help us to do justice to children and teachers alike. "No one," I said, "can walk through a few schools in different districts of London and with different rates of payment without being impressed by the wide interval in health and development that separates children in the best from those in the worst of the schools. Those in the latter are puny, dwarfish, pale and feeble when compared with those in the former, and to judge a teacher who is labouring amongst them by the same standard that is applied to another whose lot is cast amongst larger-limbed and larger-headed children with richer blood and more constitutional vigour is to do a

manifest injustice and incite to over-pressure." "The systematic measurement of the children in all elementary schools," I went on, "need occupy only a very little time, and would soon supply information of the highest practical and scientific value."

Two years earlier than 1884, in a paper on "Education and the Nervous System," I had urged the establishment of such school registers on even wider grounds, and had tried to show that they would speedily enable us to determine the rate of growth of children in different districts of the country, of different racial origin, of different social position, and with different food supplies, and would enlighten us as to the physical proportions most favourable to good health and most suitable for various employments, as in factories and in the naval and military services, while they would also elucidate the effects of the several influences at work in modifying physical development, such as the seasons of the year, rural and urban life respectively, and diseases of hereditary or acquired origin. I further maintained that these school registers would sometimes afford us timely warning of the invasion of insidious diseases. At the same time, I urged that besides school registers, family registers should be kept, something ampler than the meagre annals of the family Bible, setting forth the lineage of each child and every incident of importance in its early history, and I argued that such registers would have a wholesome moral influence on the child by impressing on it the value and significance of its individual life, and would often be of the utmost utility in the preservation of its health and in the diagnosis and treatment of any maladies from which it might suffer in after life by revealing inherited tendencies and personal proclivities and immunities.

But these proposals of mine fell on deaf ears. They were contemptuously dismissed and officially designated, I believe, "a farrago of nonsense," while at exactly the same time Mr. Francis Galton's cogent advocacy of a scheme to forecast the mental and bodily faculties of children failed to make any permanent impression. His "Record of Family Faculties" had, I understand, a large sale for one year, and has never been inquired for since, and while by Bowditch in the United States, and by Mr. Charles Roberts and the Anthropometric Committee of the British Association in this country, some tables of stature and weight and chest girth in children of the two sexes at different ages and in different circumstances have been constructed, no attempt has been made by the general measurement of the rising generation to solve any of the social problems with which we are confronted, or to extend our knowledge of the morphology of our species. Upon the effects of exercises of various kinds on muscular development, Mr. Maclaren, Sir Frederick Treves, and others interested in athletics and training have supplied us with useful hints, but no systematic and scientific investigation of growth, as influenced by climate, food, habits and surroundings, has been undertaken.

Amidst the scintillations of minute physiological exploration, the brilliant discoveries of bacteriology and the curious side-lights of experimental psychology, we have somewhat lost sight of the assistance that the patient employment of the scales and tape measure is capable of affording us in understanding our human economy and in regulating human progress.

But the time has come for an awakening on the subject of physical efficiency and for the bestowal of due attention on the methods by which it may be gauged. We have begun to realise that the conditions of industrial competition in the world have changed, that we in this country no longer possess the incontestable superiority in skill and productive power we at one time enjoyed. We have begun to perceive that the competing nations around us are becoming commercially transformed and are encroaching on our markets more and more, and we have begun to discover with consternation that we are losing, not only our geographical advantages, but to some extent the stamina of our people. The diminished death-rate upon which we have been wont to pride ourselves is but a sorry comforter if the population we are keeping alive is increasingly sickly and debilitated, and technical education will be of small avail if the standard of health amongst our working classes is being gradually lowered. And unhappily there is evidence of a striking kind that the people of our large towns, at any rate, are physically deteriorating. Mr. Arnold White has told us that of 11,000 men who volunteered at Manchester for service in South Africa only 3,000 were accepted as physically fit, and of these only 1,200 came up to the standard of what a soldier ought to be; and Colonel Borrett, the Inspector-General of Recruiting, in his recently-published report, intimates that of 75,750 men medically examined last year as many as 22,286, or 29·04 per cent., were rejected for various ailments or want of physical development, adding that amongst the class of men from which recruits are drawn, deterioration of the teeth appears to be rapidly increasing. Of 3,600 recruits medically examined at York, Leeds, and Sheffield (large towns) in four years prior to 1901 as many as 1,710, or 47½ per cent., were classed as not up to the Army standard, which has, it is to be borne in mind, been repeatedly lowered, and now stands at 5 ft. 3 in. for Infantry of the Line and 5 ft. 5 in. for Dragoons, a fact which reveals widespread physical unfitness amongst our young working men. As of course only men with what is regarded as a reasonable prospect of acceptance present themselves at recruiting stations, there must be amongst the masses, behind the dismal squad of the rejected, huge battalions of patently disqualified men—mentally defective, deformed, crippled, scrofulous, purblind, knock-kneed, flat-footed, narrow-chested—to whom no thought of soldiering ever occurs. The sum total of our physical shortcomings must be a figure that it would be woeful to contemplate. But apart from statistics, anyone who has watched the stream of men, boys, and girls issuing from a factory in the East End of London or any large town must recognise the fact

that they are stunted and pale and weak-looking when compared with our agricultural population.

It is amongst the toilers of our large towns that physical decadence is going on, but that fact only augments the serious import of that decadence, for at the present time of the whole population of England and Wales 77 per cent. are town dwellers, and only 23 per cent. remain in rural districts. There is also going on a continuous increase of the town population that is exposed to degenerative influences, and a continuous decrease of the country population from which the towns draw their sound and robust reinforcements. Of the inhabitants of our city slums it is alleged that in the third generation they are either sterile or, at best, capable of giving birth to infirm or rickety offspring, and in this connection it is to be noted that whereas in 1875 there were born in the United Kingdom 35 children for each 1,000 of population, the births in 1900 were only 29 per 1,000.

The decline in physical vigour of our urban population must of course be attributed to the conditions of town life generally, but of these there is, it seems to me, one predominantly influential, and that is, insufficient feeding during infancy and childhood. I do not by any means overlook the deteriorating influence of foul air, bleached sunlight, dirty dwellings, intemperance, infectious diseases, and chronic emotional depression; but still I maintain that it is the want of sufficient nourishment during the growth period that is the principal cause of the dwarfing and enfeeblement of our townspeople—and that want of nourishment is due to poverty—either as defined by Mr. Seeböhm Rowntree in his masterly treatise, primary, when the whole earnings of the family are inadequate to its proper maintenance, or secondary, when the earnings, although enough for maintenance, are absorbed by other expenditure, useful or wasteful.

Mr. Seeböhm Rowntree has examined, as regards their height, 1,919 children—1,014 boys and 905 girls—in the City of York, a representative provincial town in its economical, industrial and general conditions, and arranging them in three sections, the poorest in which they are habitually underfed, the middle in which they are occasionally underfed, and the highest in which they are regularly and fairly well fed, he has arrived at these results:—That at all ages from 3 to 13 the boys in the poorest section are on a combined average $2\frac{3}{4}$ in. shorter than the boys in the middle section, and $3\frac{1}{2}$ in. shorter than the boys in the highest section; while the girls in the poorest section are in the same way $1\frac{1}{4}$ in. shorter than those in the middle section and $1\frac{1}{2}$ in. shorter than those in the highest section. The average height of the boys when they leave school and go to work at 13 is less by $3\frac{1}{2}$ in. in the poorest section than in the highest; and that of the girls of the poorest section at the same time is less by $1\frac{1}{2}$ in. than that of the highest.

As regards weight, Mr. Seeböhm Rowntree found that the boys in the poorest section were at all ages from 3 to 13 on the average

$2\frac{1}{2}$ lb. lighter than those in the middle section, and $5\frac{1}{2}$ lb. lighter than those in the highest section; whereas the girls of the poorest section were on an average 3 lb. lighter than those of the middle section and $3\frac{1}{4}$ lb. lighter than those in the highest section. By the time the pinched boys of the poorest section leave school to go to work they are on the average 11 lb. less in weight than those of the highest section, and their deficiency in this respect as well as in stature would be even more startling than it thus appears, had they been compared with boys of the affluent and not of the well-to-do working class.

These figures of Mr. Seebohm Rowntree afford a painful but edifying glimpse of the havoc that poverty is playing in our wage-earning class in towns, and of the physical deterioration that is going on amongst the poorest portion of the community; and on no small scale, for he calculates that 28 per cent. of the population are living in poverty, primary or secondary, and are ill-housed, ill-clothed, and underfed. Dr. Noel Paton and Dr. Dunlop, after searching investigation and careful analysis, have concluded that the diet of a typical labourer's family in Edinburgh is decidedly too small to support even moderate labour, both when estimated in calories and in proteid value, and they suggest the possibility that the inhabitants of large cities may have their growth and working capacity limited, not only by poverty, but by bad teeth and digestive inadequacy. They show that the food supply of our poorer working classes compares unfavourably as a source of energy and most unfavourably as a source of proteid with the diets of the inmates of poor-houses, prisons, and lunatic asylums, and they point out that this food deficiency is experienced, not merely by the drunken and thriftless, but by the steady, industrious, frugal poor, who cannot make both ends meet. Especially harmful to growing children of restless habits must this food deficiency be, particularly the curtailment of its proteid constituents, for all observers are agreed that in Europe good health and normal development cannot be long maintained without a full proteid allowance. We can scarcely be surprised to find degeneracy of offspring when we learn that large numbers of mothers of the poorer working classes are during pregnancy and nursing confined to a diet consisting almost exclusively of bread, dripping, and tea. The children of the mothers of this poorest section (those of whom a considerable contingent may be seen every Monday morning seated with their little weekly bundles on the steps at the door of the pawn-shop waiting for it to open) are said to present a pathetic spectacle. They bear in their puny bodies, sore eyes, filthy heads, swollen glands, and lame joints, the unmistakable marks of privation and neglect; they are sent out into the world grievously handicapped. Through no fault of their own, these dirty atomies have been deprived of their germinal birthright, they have been subjected to sufferings that leave scars behind, they have had their store of vitality reduced, and so are left with a diminished power of resistance to the temptations to which they will be exposed, and to the disease germs

by which they will be attacked, and with a diminished capacity for bread-winning; and they have been cheated of fair proportion, and disfigured in a way that is past remedy, for it is a lamentable fact that no subsequent supply of nourishment, however liberal, will fully compensate for starvation during infancy and childhood. Time lost in growth can never be made up. Thus it has been found on training ships to which pauper boys from metropolitan unions and parishes have been sent that under the most generous treatment, and living singularly healthy lives, they always remain more or less stunted in development. The boys sent to these ships are selected and are certainly not of the worst and most depraved pauper class, but while a marked and most encouraging improvement takes place in their bodily health, bearing, and general intelligence, they retain in their low stature a record of the hard usage and poor feeding of their early days. I recollect that in the prologue to an entertainment given by the boys on board the *Exmouth* there occurred these lines:—

“And yet there's one thing saddens us and that is—
That we with all our pudding, beef and gravy,
Can't reach the standard of the Royal Navy.”

The enduring effects of an early blight are painfully illustrated in Mr. Cheatle's recent report on the Hanwell Poor Law Schools. He found that of 1,000 children in these schools, 520 could not pass the whisper test for hearing, 335 were or had been the subjects of discharge from one or both ears, 88 were suffering from chronic suppuration, and 434 had adenoids.

I have dwelt on the feeding of children, because that is, I believe, the paramount consideration in relation to their physical efficiency. “Whence shall we buy bread that these may eat?” is, to my thinking, in its economical and national aspects, the pressing question of the hour, for enhanced physical efficiency is indispensable if we are to hold our own in the world. The United States of America are becoming formidable in their rivalry to us, not only because of their spirit of enterprise, fertile ingenuity, and boundless resources, but because, as recent investigations have proved, their workers are better nourished than ours. Poor families in Philadelphia, Chicago, and New York have a considerably better food supply than poor families in Liverpool, Manchester, and Glasgow, and adopting Atwater's standard it is found that labouring-class families in our large English towns are seriously underfed, receiving only an average of 2,685 calories of fuel energy and 89 grms. of protein per man per day, thus showing a deficiency of 23 per cent. in the case of the energy value and 29 per cent. in that of the protein. Our faith that honesty is the best policy is shaken when we discover that our poorer working men receive 30 per cent. less food than convicts in English prisons. The food question is really of infinitely more moment, in the restricted area to which it applies, than the education question about which we hear so much (although, of course, they are, to some extent, bound up with each other), for

education cannot take the place of nutriment, and "the sincere milk of the word" is no substitute for that of the cow. It is for statesmen, diplomatists, and publicists to grapple with that question in its larger bearings, while local authorities, philanthropic agencies, and neighbourly good feeling deal with it in detail. Much has been done to alleviate the pangs of underfed children, but the evil is a gigantic one, and is not to be met by the supply of occasional meals. The London School Board, excluding, of course, from its purview all voluntary schools, estimated that during the winter of 1899 there were 30,930 underfed children in the Board schools in London, and in the milder winter of 1900 only 17,878. Without impugning the accuracy of that calculation for the purpose for which it was made, I would say that it conveys but a faint and inadequate idea of the food deficiency and partial starvation of London children, and of the physical failure for which these are responsible.

It is for my profession to supply information as to the best and most economical food-stuffs, and as to the best balanced dietaries for the working classes. On that subject I dare not enter here, beyond pointing out the dangers of the faulty bread and tea meal, and the high value of porridge and milk. It has been calculated that an entire day's diet of tea, bread, and butter on the one hand, and of porridge and milk on the other, gives a balance in favour of the latter of 22 grms. of protein, 32 grms. of fat, and 100 calories at a cost of 4·5d., against 5·2d. for the tea, bread, and butter diet, a saving of ·7 of a 1d., or nearly $\frac{3}{4}$ d. a day. Unhappily, porridge and milk have lost their former firm hold on Scotland as its standing dish, but they seem to have commended themselves, at least as an addition to breakfast, to the well-to-do classes south of the Tweed, and perhaps the working classes in England may be brought to recognise their advantages as well as those of lentils, beans, peas, and bacon, also highly nutritious and cheap foods.

But while insisting on the cardinal importance of feeding in relation to physical development I would not, of course, ignore its other conditions, though it is not in my province to enlarge on them now. Wholesome dwellings, fresh air, pure water, exercise and repose, are all requisites of good growth, and the want of any one of them is conducive to physical degeneracy, which I have no doubt anthropometric observations could demonstrate. Insanitary surroundings and overcrowding are prolific causes of disease in infancy and childhood, and accountable in all the poorer areas of our large towns for a terrible waste of young life, and also for much retardation of growth, and many bodily and mental infirmities. Infants and children, especially those of the impoverished class, rarely pass altogether scatheless through a zymotic disease, though the vestiges it leaves behind it may not be very conspicuous. With reference to the exanthemata, we often hear parents congratulate themselves that their children have got over them, but the truth is that children are always better without them, and that in many instances they

blemish the life which they do not destroy. To ward off, restrict and abolish them altogether, is the ultimate aim of preventive medicine.

But there is one source of physical impairment in children besides underfeeding to which I would particularly allude, because its influence is direct and obvious, and that is child labour. I do not mean to recall the atrocities that attended the employment of children in factories and mines in bygone times, but I would remind you that there is still danger in putting burdens heavier than they can sturdily bear on young shoulders. The raising of the age for half-timers has been salutary, and the introduction of automatic machinery, the spread of education, and the force of public opinion are steadily circumscribing this kind of employment; but it still exists in certain districts, especially in the textile trades, and where it does exist its pernicious consequences are appreciable. "Undoubtedly," says Mr. Wilson, one of His Majesty's Inspectors of Factories, "factory life, although not specially injurious to workers who have naturally strong constitutions, or who commence labour after having reached maturity, nevertheless neither fosters growth nor development, and has a distinctly harmful effect on undersized or badly-nourished young persons. Thus I have frequently conversed with full-grown men of 20 years and upwards who do not stand more than 5 ft. or 5 ft. 1 in. in height and who scale less than 9 st. These men have not the physical strength for heavy manual labour or indeed any task which demands prolonged effort, but must accept unskilled labourers' wages in mills or factories all their lives. Such wages are very small and quite inadequate to support a wife and family." Mr. Wilson some time ago measured and weighed 169 boys exclusively employed in jute mills in Dundee, and found that at all ages they fell far short of the standards given in Treves's tables. Thus at 11 to 12 years of age the boys measured 4 ft. 2 in. and weighed 62 lb., against 4 ft. 5½ in. and 72 lb. in Treves's tables, showing a deficiency of 3½ in. in height and of 10 lb. in weight; while at the same age the girls gave 4 ft. 3½ in. and 63 lb., against 4 ft. 5 in. and 68 lb. in Treves's tables, showing a deficiency of 1½ in. in height and 5 lb. in weight. At all ages up to 15 the Dundee children, both boys and girls, were proportionately short of Treves's tables, and their deficiency in weight when compared with American standards was still more remarkable. At 14 to 15 years of age the average Dundee boy weighs 70·5 lb. and the average Dundee girl 77·5 lb., whereas according to Holt's tables at that age the average American boy weighs 99·3 lb. and the average American girl 100·2 lb. The Dundee deficit is 28 lb. for boys and 22 lb. for girls. Comparing the Dundee children with 53 children—28 boys and 25 girls—employed in flax mills in Brechin, which is a small country town, Mr. Wilson found that the Brechin boys were at all ages from 11 to 14 on an average 3 in. taller and 12 lb. heavier than the Dundee boys, while the Brechin girls were 1½ in. taller and 9 lb. heavier than their sisters in Dundee. The poor physique of the Dundee children when compared with those of Brechin can scarcely be attributed to

inferior feeding, for the diet of the Brechin children is much the same as theirs. It may be partly owing to over-crowding in large tenements, to intemperance of parents, and to exposure to inclement weather, but it must be in some measure ascribed to the laborious work they have to undertake in insalubrious circumstances while their frames are unconsolidated and their tissues are still green and immature.

At all ages a certain proportion between height and weight is to be observed as long as health is preserved. In adults this proportion is tolerably definite, and any departure from it on either side may be taken as indicative of delicacy or disease risks where it is not itself actually pathological. Light weights are regarded as of nervous constitution, and prone to take the affairs of life more anxiously than others, and as being predisposed to nervous breakdown and tubercular complaints; and heavy weights, on the other hand, are known to die prematurely of apoplexy, heart disease, and atheromatous decay of the blood-vessels, and to be deficient in resisting power to any serious ailment by which they may be attacked; and so both light and heavy weights are looked at askance by our best insurance companies. Dr. Claud Muirhead has shown that of 524 males between the ages of 20 and 70 who died of consumption, 81 per cent. were below the standard weight and 19 per cent. above it at the time when they were insured in the Scottish Widows Fund, and when they were presumably free from disease, whereas of 502 males between the same ages who died of apoplexy, 60 per cent. were above and 40 per cent. below the standard weight when insured.

Amongst children at all ages a certain proportion between height and weight should be maintained, but in their case it is much more difficult to fix criteria owing to their markedly different rates of growth at different periods. Overweight in them is not indicative of apoplectic tendencies, and is indeed scarcely to be considered, except in rare instances where it betokens a sudden sickly spurt of growth in a fragile being, or is associated with a hebetude of mind amounting to a species of imbecility. Obesity is practically unknown in early life, and there is no call for specialists to treat it or mineral waters to wash it away. But underweight is at all early ages common, and the most frequent sign of insufficient feeding, mal-nutrition or incipient tuberculosis, and I do not doubt that the periodical measurement of children would very often, by disclosing a check in growth or a marked deviation from the normal proportion between height and weight, lead to the detection of disease still undeclared by any other outward symptom, and therefore in that stage most amenable to treatment. In some public institutions for the insane—in whom the symptoms of illness are often masked or concealed—monthly weighings have been successfully resorted to as aids to timely diagnosis.

I might pile up examples of physical deterioration in certain small groups of our people, but enough has perhaps been said to convince you that the time has come when the physical development

of the people as a whole should be closely watched and noted. Rapid changes are taking place amongst us in consonance with our quickened rate of living. I might instance the sudden appearance during the last twenty years amongst the wealthier classes of large numbers of women of the tall, willowy and narrow pelvis type, the antithesis of the plump, thick-set, rotund Englishwomen, whom Nathaniel Hawthorne forty years ago described as occupying an undue share of their Maker's footstool, thereby giving great offence. On all hands transformation, good or bad, is in progress, and it is surely expedient that by stocktaking and physical appraisement of our children from time to time we should ascertain the directions in which the several constituents of our population are moving. Man is now engaged in retracing intelligently the several steps through which he has automatically evolved, and it behoves him to determine as far as may be the laws regulating his own growth, and to apply the knowledge thus acquired to the betterment of his kind. Lord Grey has told us that we have nearly doubled the size of our cattle and sheep during the last century by recording their weights and paying careful attention to their requirements. Human beings are not as readily handled as flocks and herds, either as regards their breeding or feeding; their instincts, their aspirations, their volitions are complex and difficult to control; the medium in which they move is in incessant flux, and they themselves are highly migratory; their organic response to external agencies is slow and often hard to interpret, but still I am fully persuaded that by measuring and weighing their young, and by paying careful attention to their requirements, we may in less than a century vastly improve their physical condition; and that is the foundation upon which moral and intellectual improvement must be reared. I am fully persuaded that it is by securing an adequate supply of suitable, wholesome, unadulterated food to the children of the submerged fourth of our town population that dwindling in stature and general degeneracy can be best prevented, and our national physical efficiency maintained. We have now got a national physical laboratory in which to standardize our scientific instruments and trade materials. Why should we not standardize our flesh and blood also?

I have insisted on feeding in relation to physical efficiency because I esteem it of primary importance, but I would not therefore place in the background other factors that may largely contribute to that, and that are indeed essential to its maintenance. Of these, physical training comes first, but that is to be brought under your notice by papers specially dealing with it (there is to be one by Dr. Francis Warner, who has so ably investigated it), and I need only cursorily refer to it, and remark that I take perhaps even a larger view of its potency and promise than its most zealous advocates on the athletic side. With them I recognise the salutary effects of judicious and well-adjusted physical exercise in promoting

metabolism or tissue change, in strengthening the muscles and sinews, in literally stretching the bones to which they are attached, in lubricating the joints, in expanding the lungs, in stimulating the heart, in exhorting the liver, in conducting to a fine carriage, good manners and rude health generally; but I go further, and hold that physical exercise is really necessary to the proper development of the brain, and that we can by means of it, to some extent, modify nerve growth. All the muscles are in groups in nervous connection with certain cerebral centres, and the proper exercise of those muscular groups is, I believe, necessary not only to the functional activity, but evolution of these cerebral centres, which have psychical as well as motorial relations, and the integrity of these cerebral centres is again necessary to muscular development. Soltman has shown that the extirpation of the motor centres of the brains of young puppies leads to a general retardation and stunting of growth. The puppies from which these centres were removed were dwarfed when compared with other puppies of the same age and in all other respects similarly treated in which they had remained intact. The muscles subtending the centres removed, and the bones to which they were attached, did not grow properly. In this inter-dependence of muscles and brain centres may perhaps be found the explanation of the tolerably well-recognised mental concomitants of excessive and deficient muscular activity, and of exclusive devotion to certain kinds of gymnastic or athletic pursuits.

In these days, in this country at any rate, we have both too much and too little physical exercise. When it becomes the object of life, is pursued for its own sake, and is associated with betting, it becomes one of the varieties of physiological intemperance, has a pernicious influence on life and character, and sometimes eventuates in dilatation of the heart, aneurism, or other morbid catastrophes. One refers to the subject with fear and trembling, but I cannot refrain from expressing my belief that there would be a gain in health and happiness to the upper classes if they would make some of the physical energy they now squander in amusement definitely serviceable. There was considerable force in Mr. Dooley's observation that the battle of Waterloo was won, not on the playfield at Eton, but in the potato patches of Wexford.

The healthy, well-fed, well-made child, living a natural country life, may be safely left to regulate its own physical exercise. Its "*besoin de respirer et de folâtrer*," its curiosity, its playfulness and the solicitations of the beauty and wonder around it, will amply stimulate its active powers, and the sense of fatigue will keep them duly in check. But the town child, living under highly artificial conditions, and often amidst narrow limitations, requires guidance and encouragement in its exercise and opportunity for its indulgence. We hope to make a lot of our town children into country children one of these days, but there must always remain multitudes of town-pent little ones, and for them the means of physical exercise must be provided. First of all we want open spaces, parks and gardens planted with trees and

flowers to appeal to the æsthetic sense, and playgrounds in which the children can unrestrainedly frisk about. A thoroughly well-informed and sympathetic writer, Mr. R. A. Bray, informs us that "vast tracts of ground in North and South-East London are situated so far from any park that the child has to journey more than a mile to reach it." This practically prohibits their use, and consigns the children to the streets for such exercise as they can obtain. It is clear, therefore, that it is our bounden duty jealously to preserve every inch of urban open space that exists, and to seize with avidity on every chance of acquiring new ones. It is clear also that we must create well-equipped gymnasias and capacious swimming baths, and afford instruction in drill and dancing, which may contribute to mental equilibrium as well as to bodily agility and grace. In the cases of many town children specially designed exercises are necessary to correct abnormalities, and these should be prescribed and carried out under medical supervision. Thanks to the initiative of Lord Balfour of Burleigh, a Royal Commission is now inquiring into physical training in State-aided schools and other educational institutions in Scotland, and from its report we may hope to derive some light and leading.

Besides feeding and physical exercise, multifarious agencies operate on the child and help to make or mar its physical efficiency, and all these I would sum up under Mothering, Homing, and Schooling, which I name in the order of their importance.

Mothering in its widest sense includes the physical care of the child, as far as the family means allow, and those moral influences that more than anything else mould its character and bias its career. Matthew Arnold said that four-fifths of life are conduct; and it has been remarked that the only error in his statement is that it did not include the other fifth. Well, for my part, I am satisfied that in a large majority of men and women four-fifths of conduct are of the mother's making. It is hers by natural affinity best to understand the workings of the child's mind, and while it is in its most plastic moods to impart to it lasting impressions. It is hers if she is worthy of motherhood to implant sustaining ideals, and to teach the child to love and admire, to trust and endure, and to postpone the advent of jealousy and doubt. And as regards an enormous preponderance of the mothers in this country, I rejoice to believe that their maternal duties are according to their lights well and faithfully performed. Exceptional instances of cruelty and neglect are occasionally reported, and the indignation they excite shows how exceptional they are, but, as a rule, our English mothers of the working classes—and I believe all medical men practising amongst the poor will testify to this—are, with all their ignorance, stupidity, and superstition, affectionate to their children, zealous to promote their comfort and enjoyment, tenderly solicitous for them in sickness, anxious to make them honest, polite, and considerate to the weak and suffering. It is to our English mothers, I suggest, that we mainly owe the admirable conduct of our soldiers in South Africa.

But while I say this of our working-class mothers, I cannot help feeling that mothering is in danger at both ends of the social scale. There is a good deal too much of what might be called cuckooism amongst the well-to-do! The cuckoo has been described by Brehm as "a discontented, ill-conditioned, passionate bird." It shirks the brooding sacrifice and responsibility of parentage, and in the words of Scripture, applied not altogether justly to the ostrich, "is hardened against her young ones as though they were not hers." Are there not fashionable mothers who might be thus described? I know not how to frame an indictment against a set. There is, I suppose, a super-smart set amongst us who retain, amidst the stately circumstances to which they have been born, simplicity in living and sweet secluded domesticity; but below them there is, I am told, a smart set, rich and luxurious, many of the women of which, given up to club and restaurant and rout haunting, like the cuckoo, neglect their offspring to their own great detriment; for it is in the loving performance of maternal functions that the nature of the woman finds its fullest and finest efflorescence. Such women delegate their maternal duties as far as possible. Feeding-bottles, nurses, governesses, French maids, and lady-helps relieve them of them, and their children grow up bereft of mothering, and may be damaged in health by their deprivation. Mr. Rudyard Kipling has drawn a touching picture of a little Anglo-Indian boy who was actually dying of brain disease brought on by want of mothering, and was brought back to health when allowed to bask in it once more; and every nurse in a sick children's hospital knows what an efficacious anodyne and tonic it is, even when vicariously administered.

Amongst the poorer of the working classes, especially in our northern towns where the textile industries are carried on, mothering is interfered with by the necessity young married women labour under of seeking employment in factories or workshops, leaving their infants and children to the care of minders throughout the day, and sacrificing in a great degree the comforts of the home. An attempt has been made to show, I think unsuccessfully, that the appalling infant mortality of the towns in which employment of married women prevails is not swollen by that practice. No doubt many causes tend to keep up that mortality, but the withdrawal of maternal supervision is a deplorable evil which must lead to waste of infant life and estop some of its budding promise. To prohibit the employment of married women would, under existing circumstances, by restricting the family earnings, do perhaps more harm than good; but it is satisfactory to learn that in the towns most affected by married women's labour the percentage of married women employed is diminishing, and in the meantime much may be done to mitigate the evils of the system by the efforts of Infant Life Protection Societies, and by the domiciliary visits and teaching of female sanitary inspectors.

The influences included under homing, which next to those designated mothering are formative of child nature, ought to conduce

to healthy growth, and create associations sustaining and controlling till the end of life. The cheerful, wholesome dwelling in which the child can thrive, the familiar objects that enter so largely into its dawning consciousness, are precious possessions, very soon stamp indelible characteristics upon it, and establish deep-rooted predilections. Country-reared children do not take kindly to the towns. Brought to London they are wonderstruck and excited for a little, but soon want to go home. They are awed and harassed by the turmoil around them, realise painfully their own littleness, and crave a return to peaceful surroundings, amongst which they have a recognised place. The treasures of the shop windows dazzle and tantalise them, and do not charm and soothe like the wild flowers they can gather at pleasure and wreath in their hair. And town-bred children, again, after a certain age cannot reconcile themselves to peaceful country ways, and long for the kaleidoscopic interests of the streets. Mr. Buchanan's "Liz," after her burst into the country, says:—

"So back to London town I turned my face,
And crept into the great dark streets again,
And as I breathed the smoke and heard the roar,
 Why ! I was better, for in London here
 My heart was busy and I felt no fear.
I never saw the country any more,
And I have stayed in London, well or ill—
 I would not stay out yonder, if I could,
 For one feels dead, and all looks pure and good,
 I could not bear a life so bright and still."

Alas ! homing, too, appears to be a diminishing quantity amongst us. The very poor can scarcely be said to have a home, but move on through a series of tenements, dirty lodgings, damp cellars or close-packed warrens. Their temporary abodes are without any touch of beauty or attraction, but still so strong are the homing instincts that, as Mr. Bray tells us, the sentiments which ought to have clustered round the home, sometimes cling to "an old armchair or table that has stood the wear and tear of time." And above the very poor the home is of small account, for comparatively few of the working classes settle down anywhere and let their own affections and those of their children take root, but are very migratory in their habits, even when migration is not necessary to follow work, and waste considerable sums of money in moving, on small pretext, from place to place.

It is earnestly to be hoped that the attention that is now being directed to the housing question and to cheap and ready transit by tramways, twopenny tubes, mono-rail, and motor cars, will lead to the removal of some town industries to the country, and to the provision of country homes for a certain percentage of town workers. A cottage with a curtilage, well ventilated, lighted and drained, with trees about it that become dear friends, hedgerows with their "profuse wealth of unmarketable beauty," fields that tempt to gadding,

sounds and scents that soothe and mollify, bees and poultry that create sympathy with animated nature, is the ideal home for the working man, in which his children may grow up hardy and right-minded. As regards town homes, enormous difficulties present themselves, especially in slums and blocks of artizan dwellings, but they may at least be light-flooded and clean in a sanitary sense, and we cannot but watch with interest the action of the Improvement Trust Committee of the Glasgow Corporation in demolishing insanitary buildings on specific areas and selling the sites for other purposes, and at the same time erecting blocks of one, two, and three apartment houses for the inhabitants thus dispossessed. It may be, as is alleged, that the scheme of the corporation is, on the surface, economically unsound, and does not deal with the vicious poor, but it has a profound economical justification if it has helped even in reducing the death-rate of the city from 27·4 per 1,000, where it stood in 1876, to 21·1 in 1901.

The homing of the children of the State has lately had much consideration bestowed on it, and is undergoing highly desirable improvement. I would not join in any wholesale condemnation of barrack schools, which, considering the unsatisfactory nature of the material with which they have had to deal, have done much good work; but great evils, physical and moral, are inseparable from the amassment of crowds of poor children in institutions, and a more excellent way has been found of providing for them in village communities and in cottage homes. The boarding-out system, under strict benevolent supervision, will, by the homing it offers, confer on pauper children an individuality and self-respect, a safety from ophthalmia and other contagious diseases, a measure of health and vigour, and a store of pleasant and friendly associations that the barrack school cannot afford, whatever care may be expended on its management.

Of schooling, which follows on mothering and homing, it is necessary to speak with caution in the midst of the educational palaver that is going on around us, but the part it plays in the formation of character, although subordinate to the influences already alluded to, is momentous enough, while its relations with health are intimate and far-reaching. Painful and injurious elements that formerly mingled with it—for instance, payment by results and corporal correction—have been or are being eliminated from it; but certain grave risks still attend it, and of these one of the gravest and perhaps most difficult to obviate is the spirit of emulation by which it is pervaded. “To provoke a boy,” says Ruskin, “whatever he is to want to be something better, or wherever he was born to think it a disgrace to die, is the most entirely and directly diabolic of all the countless stupidities into which the British nation has been of late betrayed by its avarice and irreligion.” But this “diabolic stupidity” is, it must be admitted, very prevalent amongst us, for while wisely opening to youthful talent

the doorway to preferment, we are ever pressing on the dull crowds behind who can never hope to pass through that doorway, but who are encouraged to over-strain their powers in endeavouring to approach it, and are soured by envy or disappointment in their failure to reach it. Year by year our children of all classes are driven into the struggle for existence at an earlier age ; new incentives are invented to lure or goad them on at every turn, and the result is a sacrifice of that happy placidity of temperament which is most conducive to the health and growth of the child, and in some cases the induction of a nervous erethism that is apt to pass over into disease or to entail permanent debility of constitution. It is, of course, upon the sharp, precocious, excitable children immersed in the turmoil of our towns, rather than upon their more tardy and stolid rustic compeers, that competitive pressure exerts its injurious effects, but these may be traced in all directions, and I think I can detect some indications of them even in the Registrar-General's Report.

There has been during the last sixty years a substantial and gratifying decrease in the mortality from tubercular diseases in England and Wales, and by that decrease young children have especially benefited, as it is upon them that the incidence of these diseases is, and always has been, heaviest. But while in all other forms of tuberculosis there has been a steady decline in the mortality due to them at all ages during infancy and childhood, there is one form in which there has been a steady increase at certain ages during the last thirty years, and that is tubercular meningitis or inflammation of the brain. This disease, like other tubercular diseases, has had its fatality enormously diminished during infancy and up to five years of age from causes that are obvious enough, but unlike other tubercular diseases, it has shown an increased fatality in all the quinquennia following 1870 and up to 1900 from five to twenty-five years of age, that is to say, at school and post-school ages, and during the period for which schooling has been compulsory in this country. Now I do not think that improved diagnosis or altered nomenclature has had anything to do with this increase, for at the ages named diagnosis of the disease would not be difficult, and indeed the tendency would be rather to distinguish from it, and classify under other headings, diseases formerly confounded with it, and I am inclined to think, therefore, that the figures, although they are not large, do point to the more frequent occurrence of cerebral irritation, rendering the brain a more congenial soil for the tubercle bacillus, or diminishing its power of resistance to its attacks. Clearly all those sanitary reforms and improved conditions of life which have conduced to the reduction of the mortality from tubercular meningitis in infancy, must have been operative in reducing the mortality from it during childhood and youth, and when we find not only that this reduction has not occurred, but that a positive increase has taken place at these ages, we are forced to conclude that some new factor has been at work in maintaining and extending the prevalence of the disease, and I can think

of none as likely as excessive stimulation of the cerebral centres in the weak and sickly. MM. Robin and Binet have shown that a state of exaggerated respiratory activity *per se* constitutes a soil favourable for tuberculous infection of the lungs, and it may well be that a state of heightened brain activity invites the invasion of tubercular meningitis. It is that disease that is the commonest penalty of precocity, and so often cuts down our little prodigies of wit and learning, like Pet Marjorie, and it is not improbable that its continued currency during childhood and adolescence, in spite of sanitary opposition, is connected with overstrain in immature and badly-nourished brains.

The seeds of tubercle may long lie dormant in the system, and it is possible, therefore, that the copious crop of that disease during adolescence, particularly in young women from fifteen to twenty years of age, may be to some extent due to schooltime sowings. But however that may be, there can be no question that all children affected by tuberculosis should be rigidly excluded from schools, both for their own sakes and for that of their companions. The conditions of school life are propitious to the advance of the disease, and also to its propagation. Lpus, scrofula, tabes mesenterica, and tuberculous joint and bone disease are not perilous in the sense of infection, but a phthisical child, emitting from its lungs perhaps 350,000,000 bacilli in the course of twenty-four hours, is a source of imminent danger to those cooped up with it in close, badly-ventilated rooms, and kept in constrained attitudes, especially when they are badly nourished. The education of children labouring under tuberculosis should be carried on in special seaside sanatoria, where they cannot be baneful to others, and where everything is made to minister to their restoration to health.

The King, over whose recovery we are rejoicing, whose fortitude and unselfish devotion throughout his illness have filled us with admiration, and who is Patron of this Congress, said at his first council, "I am fully determined, as long as there is breath in my body, to work for the good and amelioration of my people." It is for his subjects to aid him in that noble mission, and even the humblest of them may do something by throwing his mite of personal endeavour into the treasury of public philanthropy, and in no way can the good and amelioration of the people be more surely advanced than by providing for the protection and welfare of little children.

THE INTERNATIONAL CONGRESS

FOR THE

WELFARE AND PROTECTION OF CHILDREN,

Held in the GUILDHALL, LONDON,

15th, 16th, 17th, and 18th July, 1902,

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